CLAIMS

1. An apparatus for detecting a ferromagnetic object comprising

a primary sensor adapted to measure a magnetic field and to produce a corresponding measurement signal,

a secondary, non-magnetic, sensor adapted to detect the movement of objects in the vicinity of the primary sensor, and

a signal processor arranged in communication with the primary and secondary sensors,

wherein the signal processor is configured to identify temporal variations in the measurement signal due to the movement of a ferromagnetic object within an ambient magnetic field and to correlate the identified temporal variations in the measurement signal with movement of objects detected by the secondary, non-magnetic sensor, and to provide an output indicative of the presence of a ferromagnetic object in the vicinity of the primary sensor only in the presence of a correlation there-between.

2. An apparatus according to claim 1 wherein the secondary, non-magnetic sensor comprises at least one of a photo-electric sensor, a fibre-optic sensor, a passive infrared sensor, a camera, a thermal imager, an ultrasonic sensor, a radar sensor, an electrostatic sensor, a millimetre wave sensor and a pressure sensitive mat.

3. An apparatus according to claim 1 further comprising at least one of an audible warning device, a visual warning device, and an access control device for preventing access to a prohibited area, operable by the output from the signal processing means.

4. An apparatus according to 3 wherein the access control device comprises at least one of a lock and a barrier.

5. An apparatus according to claim 1 wherein the signal processor comprises a filter arranged to substantially reject spurious variations in the measured magnetic field.

6. An apparatus according to claim 5 wherein the filter comprises a high-pass filter.

7. An apparatus according to claim 6 wherein the high-pass filter is responsive to the measurement signal produced by the primary sensor to attenuate variations therein having a frequency of less than 0.3 Hz.

8. An apparatus according to claim 5 wherein the filter comprises a low-pass filter.

9. An apparatus according to claim 8 wherein the low-pass filter is responsive to the measurement signal produced by the primary sensor to attenuate variations therein having a frequency of greater than 3 Hz.

10. An apparatus according to claim 5 wherein the signal processor comprises a comparator for comparing the amplitude of the output from the filter with an adjustable threshold level so as to indicate temporal variations in the measurement signal due to the movement of a ferromagnetic object within an ambient magnetic field.

11. An apparatus according to claim 1 wherein the primary sensor has a first magnetic sensor comprising one of a fluxgate sensor, a magneto-resistive sensor, a magneto-impedance sensor, a hall-effect sensor, and a galvanic coil sensor.

12. An apparatus according to claim 11 wherein the primary sensor has a second magnetic sensor comprising one of a fluxgate sensor, a magneto-resistive sensor, a magneto-impedance sensor, a hall-effect sensor, and a galvanic coil sensor.

13. An apparatus according to claim 12 wherein, at least one of the first and second magnetic sensors is separable from the signal processor such that, in use, the at least one separable sensor may be disposed remotely to the signal processor.

14. An apparatus according to claim 1 wherein, in use, the primary sensor is arranged to detect ferromagnetic objects in the vicinity of a magnetic resonance imaging scanner.

15. A magnetic resonance imaging scanner comprising an apparatus for detecting ferromagnetic objects according to any of the preceding claims.

16. A method for detecting a ferromagnetic object comprising the steps of

(i) measuring a magnetic field using a primary sensor and producing a corresponding measurement signal,

(ii) detecting the movement of objects in the vicinity of the primary sensor using a secondary, non-magnetic, sensor,

(iii) identifying temporal variations in the measurement signal produced by the primary sensor due to the movement of a ferromagnetic object within an ambient magnetic field,

(iv) assessing said identified temporal variations in the measurement signal in conjunction with movement of objects detected by the secondary, non-magnetic sensor to determine a correlation there-between, and

(v) in the occurrence of a correlation, providing an indication of the presence of a ferromagnetic object.